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Snapshots of informed learning: LIS and beyond

Hilary Hughes and Christine Bruce

1. Introduction

The nature of library and information science (LIS) education is under scrutiny in Australia and elsewhere, with calls to reform approaches to professional learning (Gerolimos, 2009; Jaeger et al., 2012; Jaeger et al., 2011; Partridge, 2011). It imperative that LIS programs prepare graduates for the challenges of a changing environment, where the boundaries between 'library' and 'information' are blurring and new professional horizons are opening up. In addition to specialist LIS knowledge and practices, future information professionals need well developed capabilities for complex problem solving, decision making and strategic management. To support these outcomes, there is a need for innovative LIS curriculum and pedagogy.

Responding to these needs, the paper introduces the theory and practice of *informed learning.* After explaining how informed learning originated within the LIS discipline we outline the principles and characteristics of informed learning. Then to illustrate informed learning in practice, we present snapshots of three units of study from LIS programs at Queensland University of Technology (QUT), followed by an overview of informed learning developments beyond LIS. Finally, we reflect upon the relevance of informed learning to LIS education and its wider contribution to learning and teaching in higher education.

2. Origins and conceptual basis of informed learning

Informed learning (Bruce 2008, Bruce and Hughes 2010) is a pedagogical construct, developed by Christine Bruce at Queensland University of Technology, together with other LIS researchers including Mandy Lupton (2008), Sylvia Edwards (2006) and Hilary Hughes. Hughes (2009; 2012) developed a particular interest in the potential of informed learning to support the learning of international students through her doctoral work. In recent years, informed learning concepts have supported learning and teaching in a variety of contexts, at QUT and elsewhere.

Quite simply, informed learning is about "using information to learn" (Bruce, 2008), where information is understood to be 'anything that informs' in a particular context. Thus information can include: personal and professional experience, facts, theory, research findings, statistical models, architectural designs, sensory stimuli and observed phenomena. Lupton (2008) and Lloyd (2010) in particular have shown that information takes a wide range of expressions, apart from those normally associated with formal information access and retrieval. In informed learning forms of information do not have objective status, but rather acquire status in context. Thus professional experience for example may be considered of equal value to internal statistics in a workplace context.

Conceptually, informed learning builds on phenomenographic, and closely related research into information and learning, in particular the understanding that using information to learn is a complex experience with seven inter-related 'faces' (Bruce, 1997; Bruce, 2008).

1. In the first face informed learning is experienced as using technology to communicate and keep abreast of developments. While Information and communication technologies take central place their purpose is to bring information into awareness or enable communication. Social support is vital for a positive experience.
2. In the second face, informed learning is experienced as sourcing information to meet a learning need. Here information sources take central place, however the nature of information sources is widely interpreted, incorporating the personal and organisational; and the support of experts is of key importance.
3. In the third face informed learning is experienced as engaging in information processes to learn. These processes are grounded in personal heuristics, shift according to context and are usually linked to the need for problem solving or decision making.
4. In the fourth face informed learning is experienced as making connections between information and learning needs. Information is recognised as potentially relevant to a personal project, problem or activity and a mental or technical association is formed between the two.
5. In the fifth face informed learning is experienced as building a knowledge base in a new area of interest. Critical analysis is used as a key strategy for 'coming to know', especially when developing understandings of previously unexplored territory.
6. In the sixth face informed learning is experienced as extending knowledge. Here intuition serves as a key strategy for extending personal knowledge into something new. Creativity, intuition and inspiration work together to make new knowledge possible.
7. In the seventh face informed learning is experienced as making wise use of information for the benefit of others. Here being aware of personal and professional values and our interrelationships with others allow us to bring our personal qualities to decision making and personal judgement. (adapted from Bruce 2008, 41-52)

Learning in this model is understood as coming to experience some aspect of the world, in this case using information to learn, in different ways (Bruce 2008, 5; Marton and Booth 1997). Learners develop understanding or knowledge about information and information use by experiencing them in qualitatively different ways.

In practice, informed learning provides a conceptual framework for both formal and informal learning contexts (Bruce and Hughes, 2010; Bruce, Hughes and Somerville, 2010).
In this way, informed learning differs from functional, skills based approaches to information literacy education. Within an informed learning framework, digital and other information skills are seen as essential building blocks that students develop coincidentally, rather than as separately taught competencies. As we demonstrate later, in higher education, informed learning aims to enhance curriculum and pedagogy for transformative learning outcomes, through a contextualised process of inquiry and discovery.

3. Principles and characteristics of informed learning

Informed learning concepts reflect research findings about the different ways that people experience using information to learn. It incorporates three key principles and embodies twelve characteristics.

The three key principles of informed learning are as follows:
1) Informed learning takes into account learners' existing experiences of informed learning, especially through the use of reflection to enhance awareness
2) Informed learning promotes simultaneous learning about disciplinary content and the information using process; here the idea of simultaneous learning contrasts with separating information skills from learning about subject matter as is often the case.

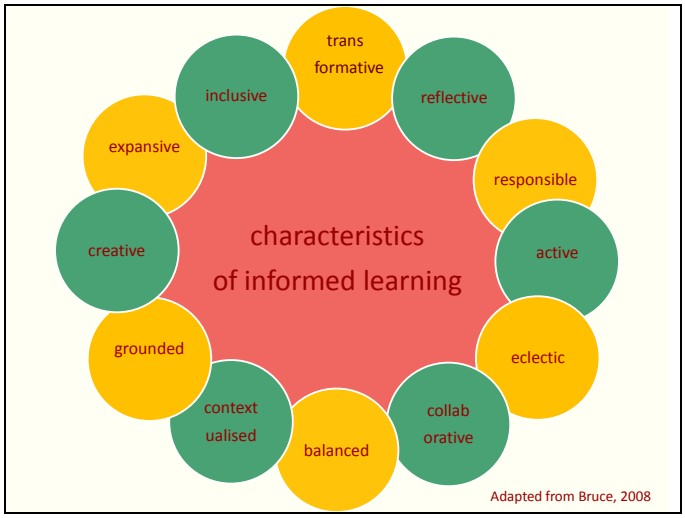
3) Informed learning brings about changes in learners' experience of information use and of the subject being learned; this is n accordance with the idea of learning being about becoming aware of new ways of experiencing. (Bruce, 2008. 12-13)

The twelve characteristics of informed learning both describe the nature of informed learning and provide a framework for its practical implementation in a particular educational context. As Figure 1 below shows, the characteristics are inter-related and they all need to be addressed when designing informed learning curriculum and pedagogy. The nature of each characteristic is explained below.

Informed learning is:

- **expansive** in that it seeks to expand students' awareness, experiences and repertoire of different ways of using information to learn
- **grounded** in that it is founded on academic and professional practices; engages students in information practices which reflect the disciplinary or professional experience relevant in their field, usually tasks/engagements that bring together the learning of discipline content and information experience
- **active** in that it underpins collaborative and independent learning, problem-solving, evidence-based practice, research and innovation
- **reflective** in that it enables learners to draw on their intuition and previous experiences and extend their understanding/awareness? through reflection
- **creative** in that it enables students to apply new information and understandings to the creation, application and dissemination of new knowledge in familiar and novel contexts
- **eclectic** in that it engages students with information in diverse forms information, sources and media
- **contextulaised** in that it develops students' familiarity with information pertinent to particular disciplines and contexts (formal and informal)
- **inclusive** in that it promotes social and cultural awareness, community engagement and shared learning among diverse student populations
- **balanced** in that it promotes a holistic approach to using information to learn, that emphasises the development of a critical, ethical, reflective and creative approach to information use rather than discrete digital competencies
- **socially responsible** in that it promotes ethical and wise information use, that respects the information rights, safety and privacy of all information users, and enables informed decision-making and activity
- **collaborative** in that it is a shared responsibility of educators, researchers and practitioners in particular disciplines, information and ICT professionals, industry and the community
- **transformative** in that it can bring about change in the ways learners understand themselves , their discipline and their professional practice; consequently it can bring about personal and social development

Figure 1: Informed learning characteristics



4 Snapshots of informed learning in LIS

To illustrate informed learning in practice, the following three pedagogical snapshots show its principles and characteristics embedded into the design of LIS units of study at QUT. The first snapshot features an online unit within the MEd (Teacher-Librarianship) program, while and the second and third feature blended learning units in the Master of Information Technology (LIS) and Master of Information Technology (Digital Environments) programs.

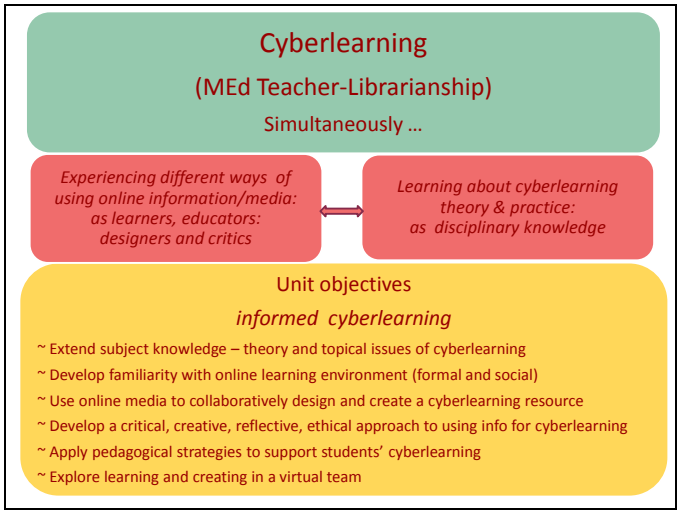
4.1 Snapshot of Cyberlearning unit

Cyberlearning is a popular unit within the Master of Education program, as a core unit for Teacher-Librarianship students and an elective unit for many others. It aims to enhance students' understanding and practice as educators in varied contemporary environments. Here *cyberlearning* is defined as learning in online environments mediated by online technologies.

The student group is varied, in terms of educational and professional backgrounds. It is also culturally diverse, as a large proportion are international students. Most students are practising primary or high school teachers, including Teaching English as a Second/Foreign Language (TESOL/TEFL); some are educators and information professionals from the vocational or higher education sectors. Students come to this unit with varying degrees of expertise and confidence in using online technologies. Most are comfortable using popular Web 2.0 tools, while a few have well developed IT skills; but many have quite limited experience of online learning and teaching.

The unit design integrates all of the principles and characteristics of informed learning, as Figure 2 below indicates. In line with the first principle, students simultaneously experience using online information to learn about online learning theory and practice learn. They develop knowledge and expertise of cyberlearning by experiencing it from multiple perspectives as learners, educators, designers and critics.

Figure 2: Cyberlearning outline



Each of the characteristics of informed learning are woven into the fabric of the Cyberlearning unit. Thus:

- The first objective - *Extend subject knowledge* – relates particularly to the *expansive* characteristic
- The second objective - *Develop familiarity with online learning environment* – relates particularly to the *contextualised, grounded, active* and *eclectic* characteristics
- The third objective - *Use online media to collaboratively design and create a cyberlearning resource* – relates particularly to the *creative* and *collaborative* characteristics
- The fourth objective - *Develop a critical, creative, reflective, ethical approach to using information for cyberlearning* - relates to the *balanced, reflective, and responsible* characteristics

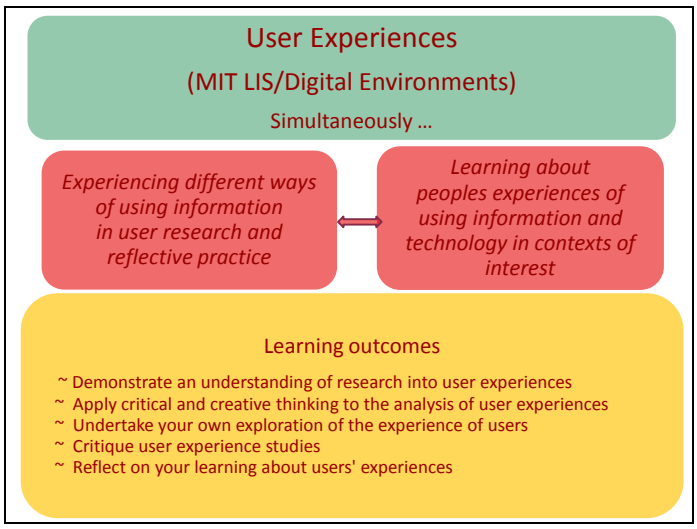
Moreover, the unit as a whole embodies the *inclusive* and *transformative* characteristics. It purposefully offers each student, whether an online novice or a relative expert, an opportunity to extend their online horizons, on the basis that the rapidly changing online environment ensures that there's always something new to explore.

4.2 Snapshot of Information Experiences unit

Information Experiences is a blended unit within the Master of Information Technology at QUT. It is taken by LIS students as an elective and by students from a wide range of MIT majors. Similar to the Cyberlearning unit featured above, this study group is culturally diverse. In the 2011 class of 50 students, about 70% were international.

This unit (Figure 3 below) aims to extend learners' use of information from multiple domains, from their personal, observed, reflected and documented experiences. It involves students in a semester long, sustained exploration of people's experience of a chosen technology (such as a self check-out machine) or of a particular context (such as a library space or Facebook). Students experience different ways of using information whilst researching their topic; and simultaneously, they extend their disciplinary knowledge about users experiences of information, technology or services. Students are also encouraged to explicitly reflect on the forms of information which they use, and how this has influenced their learning, both in class and through journaling.

Figure 3: User Experiences outline



The User Experiences unit abides by the principles of informed learning in the following ways:

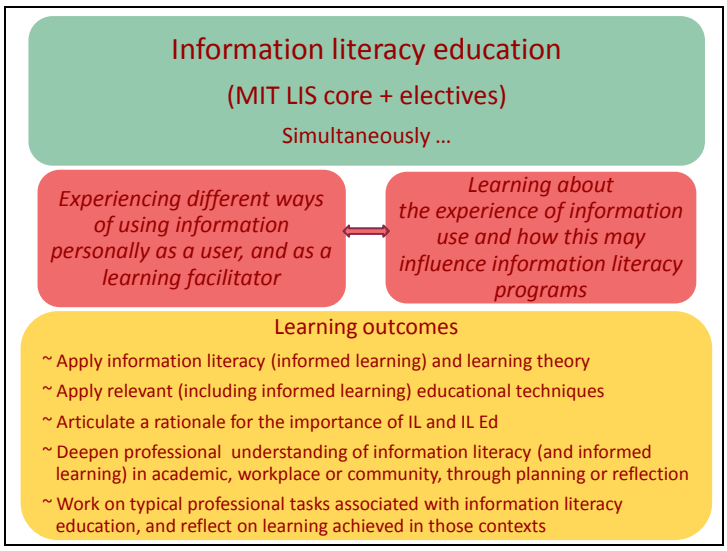
1. It takes into account learners' existing experiences of information use and the subject being learned, by inviting them to include reflection on personal experience in their research, and by encouraging them to regularly focus on themselves as 'information users'
2. It promotes simultaneous learning about disciplinary content and the information using process, by inviting them into active learning, using reflective, oral, and observed information as well as textual and other digitised information.
3. It brings about changes in learners' experience of information use and of the subject being learned, by widening their repertoire of information use strategies as well as their awareness of different forms of information being used.

In this unit students do not automatically recognise the range of information they are drawing on in the learning process, and typically need to engage in a simple reflective exercise to begin to appreciate this. Simple questions like 'what has served as information for you as you have completed this subject this semester?' has the desired effect.

4.3 Snapshot of Information Literacy Education unit

The Information Literacy Education unit is also within the Master of Information Technology at QUT. This blended unit (Figure 4 below) is taken as a core unit by LIS students, and as an elective by students from a wide range of MIT majors.

Figure 4: Information Literacy Education outline



The Information Literacy Education unit aims to:

- Extend learners' understanding about the theory of informed learning within the context of expanding information literacy research and pedagogy
- Encourage learners to reflect on their own experiences of using information to learn
- Encourage learners to apply alternative ways of using information to learn through practical learning design.

To achieve these aims, students explore and use informed learning theory through designing and implementing an information literacy education event. This enables them to engage with information literacy theory, especially the *Seven faces of information literacy* (Bruce, 1997) and the notion that people experience using information to learn in qualitatively different ways; and with the *Six frames for information literacy education* (Bruce, Edwards and Lupton, 2006) which provide different lenses for viewing and developing informed learning experiences. They then apply this theory to a practical context. In addition to developing active learning strategies, the students reflect upon:

- The curriculum frame(s) they adopted from the *Six frames for information literacy education* and the information literacy model or framework that informed the design and delivery of their event
- The frames through which they, and others, had been thinking about information literacy and information literacy education
- Which of the *Seven faces of information literacy* they had observed themselves or others using

The unit addresses the principles of informed learning, since it:

1. Takes into account learners' existing experiences of information use and the subject being learned, by inviting them to include reflection on personal experience of using information to learn, as well as inviting them to consider the information experiences of specific client groups.
2. Enables students to simultaneously learn about disciplinary content and the information using process, using reflective, oral, and observed information as well as textual and digitised information.
3. Brings about changes in students' experience of information use and of the subject, through designing informed learning experiences for others.

In this class the application of theory to practice, from a new professional perspective is vital in changing students awareness of how the idea of information literacy might be professionally approached and personally experienced.

5 Informed learning beyond LIS

To demonstrate the transferability of informed learning across different higher education contexts, in this section we highlight the application of informed learning beyond LIS programs.

5.1 Informed learning underpins a charrette-based workshop

While the previous snapshots illustrated informed learning applied to whole unit design, this example shows how it can support a particular learning event, in this case a workshop within a QUT unit entitled Designing Spaces for Learning. This Master of Education unit attracts students from a range of Major study areas, including Teacher-librarianship. It fuses innovative designing and pedagogy.

The workshop takes the form of a charrette, that is: *"An intensive, hands-on workshop that brings people from different disciplines and backgrounds together to explore design options for a particular area or site"* (*People and particpation.net,* n.d.) It involves students in a collaborative process that focuses on an authentic learning design problem associated with the need to revitalize the outmoded Curriculum Collection area within QUT Kelvin Grove Library. The students assume various stakeholder roles, such as students, researchers, lecturers, librarians and interested community members. First, they evaluate the actual library space, using a heuristic (self-guiding questionnaire). After sharing their responses with the whole group, they use a second heuristic to compile design ideas that address design problems identified during the initial evaluation. Then they engage in discussion with a view to reaching consensus about a new design concept for the space. Finally, they develop rough drawings and notes to support further review and planning. Throughout this process, students can draw on a variety of information, including architectural plans, images of other innovative learning spaces, research and professional publications, observations of library users and library staffs' anecdotes.

The principles and characteristics of informed learning are apparent throughout the design and implementation of this workshop. For example, the students are simultaneously using a variety of information *critically* and *creatively* to learn *actively* about learning space design. By assuming personally and professionally relevant roles and considering an authentic design problem in the library, their learning experience is *grounded* and *contextualised.* Subsequent blogging about the charrette process fosters a *reflective* approach. The lecturer has noticed evidence of *transformative* outcomes when students incorporate a charrette in their project assignment or report later that they have used a charrette to address a design problem in their own educational context.

5.2 Informed learning supports personalised language learning

Personalised Language Development aims to support international students' development as informed English language teachers; critical, ethical and creative scholars; and fluent users of academic English. It is a unit within the Master of TESOL (Teaching English as a Second Language) program at QUT. Most of the students are already experienced teachers of English in their home country. While they bring richly varied knowledge and experiences to their study, they are not always familiar with the prevailing academic language and scholarly information using practices at their host Australian university. Therefore, the unit

intentionally takes international students on an informed learning journey, involving the exploration of new concepts and scholarly conventions.

The focus of the whole unit is preparing a literature review on a self-selected topic relevant to English language learning and teaching. In keeping with informed learning principles, it provides an opportunity for students to simultaneously develop their disciplinary knowledge, as well as their information using repertoire and English language capabilities.

The unit design reflects all characteristics of informed learning. The students' learning experience is *expansive and eclectic,* as the unit encourages an inquiry based approach. Thus, students extend their knowledge about TESOL and their familiarity with an increasing range of information sources*;* and at the same time they are developing their English language capabilities through searching for, reading, evaluating, synthesising and communicating many types of information. It is both *grounded* and *contextualised*, as it familiarises international students with the prevailing academic language and practices at their host Australian university. The unit design incorporates *collaborative* and *active* characteristics by involving students in team based problem solving tasks, such as learning how to use a wiki to share their responses to a reading. It is also *balanced:* to enhance students' generally well developed Internet skills, the unit emphasises critical and strategic information use, for example through weekly literature critiques and peer reviewing. The unit design reflects the *creative* characteristic, by encouraging the students to present their findings with originality and flair, via written and oral media. It reflects the *responsible* characteristic by raising students' understanding of intellectual property and referencing conventions, and promoting ethical information using strategies throughout the research and writing process. The unit design fosters the *inclusive* characteristic by encouraging students draw on and share their varied cultural knowledge and new discoveries on their informed learning journey. It is inherently *reflective*; throughout the unit, students engage in *reflective* journaling about their informed learning experiences and their development as English language learners and teachers.

5.3 Informed learning as first year experience

Further afield, informed learning successfully underpinned a First Year Experience course (unit) at University of Colorado Denver in 2010. Here Hilary Hughes collaborated with Dr Carole Basile, an Education professor, in redeveloping the course *Learning in the 21st Century.* Together we identified a way to weave informed learning through the existing course syllabus, providing a narrative thread of *informed learning journey.* Each week's class focused on a different topic relevant to first year students' needs, enabling them to develop knowledge of basic learning theory (subject) whilst engaging with different types of information, to explore how they and other people learn with and through information (process). Learning activities included formal exchange of information, informal inquiry and quizzes, as well as visits to different learning sites such as the city museum, a science expo and a nursing simulation laboratory, and the university library.

The students were socially and culturally diverse. Many were 'commuter' students who lived at home and were first in family to attend university. They were generally committed, students, but tended to be challenged by the level and conventions of tertiary study. Some Individuals were also battling personal, financial and health concerns. Consequently, the course aimed to be *inclusive* and personally *relevant* to the students. From the outset, they were encouraged to consider themselves as informed learners who were undertaking an academic and a journey of discovery about themselves and their learning environment; and to become aware of the different ways in which they and other people learn. By building a community of fellow travelers, the unit supported *collaborative* and *social* learning. Assessment included the compilation of informed learning maps and treasure chests, which

enabled the students to capture their information using and learning experiences and establish a *reflective* approach.

5.4 Informed learning supports library redesigning

In addition to enhancing student learning in higher education, informed learning has supported organizational change and professional development. For example, at California Polytechnic State University at San Luis Obispo (Somerville, 2009) the key concept of *using information to learn* became one of four guiding principles of an "action-oriented, information-focused, and learning centred approach" which brought about organizational transformation within an academic library. Through a process of "working together" with students and faculty members, the library's professional and paraprofessional staff "learned to reinvent library services, systems and programs 'for and with' users and other learning partner 'stakeholders' " (Somerville, 2009, p. 1). These collaborative initiatives provided opportunities for librarians to extend their role across the campus through participation in research, curriculum integration and experimental use of facilities.

Similarly, informed learning contributed to the redesign of information and educational services at the Auraria Library at University of Colorado Denver. This project promotes individual and collective learning through situated 'information in context' experiences (Somerville and Howard, 2010). Its 'appreciative framework' explicitly values information sharing and enables knowledge creation through shared leadership, drawing on theories and practices of shared leadership, participatory action research, collaborative design and reflective practice (Somerville & Brown-Sica, 2011). The redesign process includes refurbishment of the library building; redesign of library services; enhancement of information literacy education; professional development for library staff. Throughout the principal concern is for enhancing learning and teaching rather than information resources and their delivery, all the time using information to learn. Continuing professional development supports Auraria Library staff in this transformative process. For example, they have participated in a series of workshops to promote understanding, dialogue and strategy building around informed learning (Hughes, 2011; Hughes & Bruce, 2012). Through these workshops, the librarians came to see themselves as informed learners, whilst simultaneously enhancing their practice as educators by planning and applying strategies for curriculum-based informed learning.

5.5 Emerging informed learning research and practice

In addition to the more established activities described above, other researchers and educators continue to explore and implement informed learning in higher education.

Clarence Maybee's current doctoral research examines how informed learning is "enacted" in the classroom. He seeks understanding about "what teachers say and do that enables undergraduate students to develop a more sophisticated understanding of using information to learn" (Maybee, n.d.) Relevant to the *collaborative* characteristic of informed learning, Maybee also considers the evolving role of librarians, in particular "what is the role of librarians in making informed learning happen?" (2011)

In exploring the potential of problem based learning to enrich students' experience of information literacy, researchers at Utah State University have revealed connections between problem based learning and informed learning (Holliday, Diekema and Leary, 2011). Their findings show that students tend to be motivated by working on authentic problems, and those who engage deeply with information discover new questions and directions for inquiry. Moreover, the more engaged students apply more sophisticated evaluation strategies and think metacognitively. In these ways, they appear to experience the *expansive, active* and characteristics of informed learning.

At University of Florida, supported by an IMLS grant, Melissa Gross and Don Latham (2011) have drawn upon aspects of informed learning in developing an instructional session to support the attainment of information literacy. This session centres around the ASE Information Skills Process Model, with a view to helping students improve their information skills for personal and academic purposes. Although ASE appears closer to traditional information skills models, it emphasizes the *Personal relevance frame for informed learning* (Bruce, 2008). Gross and Latham explain that their focus group findings indicated the need for information literacy instruction to be personally relevant to students. This session also appears to reflect the contextualized and reflective characteristics, as the topics and contexts are developed by the students according to their personal interests; and they are required to reflect on their own experiences and assess their own processes and results.

6 Reflection on informed learning

The snapshots of informed learning in LIS programs and the overview of developments beyond LIS reveal the multifaceted nature of informed learning, as we understand it as educators. But how do learners experience informed learning? It is evident from student reflections written during several of the featured units that informed learning can bring about changes in learners' conceptions of information literacy through experiencing information in different ways, more than reading or listening to a lecture. For example, one student showed its transformative impact through her increased awareness of the connection between using information and learning:

> My own idea of learning is shown in the knowledge face where information is turned into knowledge by applying context. What I didn't think of was the knowledge extension aspect of applying creativity to that information and the wisdom face which applies my own values to my knowledge. So while I did understand the basic concepts I hadn't examined and broken down the concept into their individual pieces or examined properly the process of using information such as the knowledge face or the process face. (Julia Garnett, 2012)

Thus, as LIS educators we need to enable learners, as future information professionals, to experience information in different forms, media and contexts and to critically consider the relationships between the information using processes they are using and the disciplinary knowledge they are building. Furthermore, we must encourage them to embrace their potential as informed learning educators within their wider role as information professionals. The principles and characteristics of informed learning provide a framework for developing curriculum and pedagogy that responds to these educational needs.
Informed learning is particularly relevant to LIS education for several reasons:

- Informed learning has evolved out of information literacy research (Bruce, 1999; Edwards 2006; Lupton, 2008; Hughes, 2009; forthcoming); in other words, it pertains to our own LIS research field.
- LIS professionals have traditionally led the field with information literacy education (Andretta, 2005) and informed learning enables us to continue this tradition in increasingly diverse and information-rich educational environments.
- Informed learning has the theoretical base that is lacking in most information literacy standards (such as Bundy, 2004) and models (such as Big 6, Eisenberg). For LIS educators and information professionals, it offers a pedagogically rich framework to support the development of more sophisticated and discerning information using learners. Importantly also, its research base offers academic credibility for forging learning and teaching partnerships between information professionals and academic colleagues, This goal has been pursued with varying success by many academic librarians.

Informed learning also has potential to enhance learning beyond LIS education. As previously demonstrated, informed learning is transferable across disciplinary and professional contexts, for the following reasons:

- Informed learning meshes well with other widely adopted pedagogical approaches, such as experiential learning, inquiry learning, reflective practice and problem-based learning, through shared objectives such as reflection, critical thinking and active learning.
- Informed learning promotes collaborative approaches involving educators from varied specialist areas. For example, in the first year experience unit described above, Basile and Hughes taught collaboratively together. Moreover, the unit's teaching team also included a university librarian, learning advisors, a fourth year student mentor, as well as museum and nursing educators during site visits.
- Informed learning responds to an identified *information literacy imbalance* (Head & Eisenberg, Hughes, Bruce, & Edwards, 2007; Hughes, 2009) between university students' more developed digital skills and less critical and strategic information using approaches. This continuing imbalance, despite provision of information literacy programs at most educational institutions, suggests that predominant skills-based approaches are inadequate for contemporary information-learning environments. A more holistic curriculum based approach, such as informed learning is clearly needed.
- Informed learning promotes inclusive approaches, which embrace the learning opportunities presented by culturally diverse student populations, whilst enabling all students to negotiate the complexities of their information-learning environment, with its academic language and prevailing scholarly conventions (Hughes, 2009; forthcoming).

7 Conclusion

Informed learning may be considered to contain many of the elements of "good pedagogy", as it is built from theoretical perspectives that have heavily informed higher education teaching and learning best practice, especially through the phenomenographic research movement. However, informed learning is also innovative and distinctive in that it draws upon learners' experiences of using information to learn and provides a theoretically based framework for developing reflective, inquiry–focused learning in LIS and beyond. By preparing graduates who use information flexibly, critically, ethically and creatively for responsible and socially aware problem-solving and decision-making, informed learning responds to the education needs of LIS professions in transition. More widely, by supporting collaborative curriculum and pedagogy it responds to interdisciplinary imperatives of contemporary higher education.

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